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Evaluation of Removable Prostheses and Oral Conditions in Long-Term Denture Wearers: A Clinical Study

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Abstract **Background**: Long-term use of removable prostheses is widespread, yet prolonged wear may predispose to mucosal pathology and functional deterioration. this study was planned to evaluate prosthesis condition and oral mucosal changes among long-term denture wearers and examine associations with duration of use. **Methods:** In a cross-sectional clinical study, 120 adults (≥40 years) wearing complete dentures (CDs) or removable partial dentures (RPDs) for ≥5 years underwent interviews and standardized oral examinations. Variables included demographics, prosthesis type and age, hygiene practices and mucosal findings (denture stomatitis, traumatic ulcer, angular cheilitis, inflammatory hyperplasia). Descriptive statistics summarized distributions; Chi-square tested associations (α=0.05). **Results:** Among 120 long-term denture wearers (mean age 62.4 years), complete dentures were more common than partial dentures. Nearly three-quarters of participants exhibited at least one mucosal lesion. Denture stomatitis was the most frequent condition, followed by traumatic ulcers, angular cheilitis and inflammatory hyperplasia. Lesion prevalence increased progressively with longer denture use, demonstrating a significant association between prosthesis age and mucosal pathology ($p < 0.05$). Common prosthesis-related issues included occlusal wear and compromised base adaptation, particularly in older dentures. **Conclusion:** Oral mucosal lesions are highly prevalent in long-term denture wearers and show a clear correlation with increasing prosthesis age. Regular surveillance, timely relining or replacement, strict hygiene reinforcement and avoidance of nocturnal wear are essential to reduce tissue morbidity and enhance oral health–related quality of life.

Key Words Dentures, Stomatitis, Denture, Mouth Mucosa/pathology, Edentulous Mouth, Cross-Sectional Studies

INTRODUCTION

Edentulism remains a significant public health concern worldwide, with millions of individuals depending on removable prostheses for oral rehabilitation. The replacement of missing teeth with removable complete or partial dentures continues to be one of the most common treatment options, particularly in developing countries where access to implant therapy may be limited due to financial and systemic constraints [1]. Given that many individuals use the same prosthesis for extended periods, monitoring oral health changes in long-term denture wearers is especially important.

Long-term denture use has been associated with physiological, pathological and functional changes in the oral cavity. Continuous mechanical loading of the mucosa and residual ridges by removable prostheses may accelerate alveolar ridge resorption, compromise denture stability and necessitate frequent relining or remaking of prostheses [3]. Moreover, denture-related mucosal lesions, including traumatic ulcers, denture stomatitis, angular cheilitis and hyperplasia, are highly prevalent among chronic denture users [4]. These lesions develop through multifactorial mechanisms that include biofilm accumulation, Candida colonization, reduced salivary flow and chronic mechanical irritation [5].

The quality of life of denture wearers is directly influenced by these clinical outcomes. Poorly fitting prostheses can lead to discomfort, reduced masticatory efficiency and psychological dissatisfaction, thereby reducing patients' willingness to use dentures consistently [6]. On the other hand, satisfactory prosthodontic rehabilitation improves patient confidence, nutritional intake and social well-being, highlighting the importance of long-term monitoring of oral health in denture wearers [7].

Several epidemiological studies have emphasized that the oral mucosa of denture users requires continuous evaluation due to the high prevalence of prosthesis-related lesions. It has been reported that nearly 50–70% of complete

denture wearers develop some form of mucosal abnormality during prolonged usage [8]. Despite this, there is limited clinical evidence from Gulf and Asian populations, where denture use often extends for many years due to socioeconomic factors and restricted access to replacement prostheses. Additionally, systemic conditions such as diabetes mellitus, immunosuppression and aging-related salivary gland hypofunction further predispose individuals to denture-related oral pathologies [9].

In recent years, clinical research has increasingly focused on the correlation between denture quality, duration of prosthesis usage and the incidence of oral conditions. While short-term outcomes of removable prostheses are generally well studied, there is a relative paucity of data on long-term wearers, especially in populations with limited access to advanced prosthodontic care. This gap underscores the need for focused studies examining prosthesis condition and mucosal health in long-term denture wearers.

Therefore, this study evaluated the condition of removable prostheses and the prevalence of mucosal lesions among long-term denture wearers and examined the association between prosthesis age and oral conditions.

Objectives

Primary Objective: To evaluate the condition of removable prostheses and the prevalence of oral mucosal lesions among long-term denture wearers.

Secondary Objective

To examine the association between prosthesis age and the presence and type of mucosal lesions.

METHODS

Study Design

A cross-sectional clinical study was conducted to evaluate the condition of removable prostheses and the prevalence of oral mucosal lesions among long-term denture wearers.

Study Setting

The study was carried out in the Department of Prosthodontics, at a tertiary care center over a defined study period. All clinical examinations were performed in the department's outpatient clinic under standardized conditions.

Participants and Sampling

Eligibility Criteria

Inclusion Criteria:

- Adults aged 40 years and above
- Wearing complete or partial removable prostheses for at least 5 years
- Provided written informed consent

Exclusion Criteria

- Prosthesis age <1 year
- Systemic mucosal diseases (e.g., lichen planus, pemphigus), head and neck radiotherapy/chemotherapy
- Implant-supported or fixed prostheses

Sampling Technique

Participants were recruited using a consecutive sampling method from patients reporting to the Prosthodontics OPD.

Sample Size Calculation

The sample size was calculated using the formula: $n = Z^2 P (1–P) / d^2$ assuming:

- Prevalence (P) of denture-related lesions = 60%
- Confidence level = 95% (Z = 1.96)
- Allowable error (d) = 0.08

The minimum required sample size was 113, which was rounded up to 120 participants.

Clinical Examination

All examinations were performed under adequate illumination using a mouth mirror and explorer. Two calibrated examiners evaluated all participants. Inter-examiner reliability was established using Cohen's kappa ($\kappa = 0.82$), indicating excellent agreement.

Data collected included demographic variables, duration of denture use, hygiene practices, nocturnal wear habits and mucosal findings.

Prosthesis Evaluation

Prosthesis condition was assessed using standardized clinical prosthodontic criteria:

- **Retention:** Evaluated using vertical pull tests
- **Stability:** Assessed by applying lateral pressure and observing rocking movement
- **Occlusal wear:** Evaluated visually and confirmed with articulating paper
- **Base adaptation:** Assessed through border molding checks and pressure-indicating paste
- **Surface roughness and cleanliness:** Visually inspected for plaque, calculus and discoloration

Each parameter was recorded as satisfactory or unsatisfactory based on clinical judgment.

Mucosal Lesion Assessment Criteria

Oral mucosal lesions were diagnosed using:

- **WHO Oral Health Assessment Form 2013** guidelines
- **Newton's Classification** for denture stomatitis (Types I–III)
- Standard diagnostic criteria for traumatic ulcers, angular cheilitis and inflammatory hyperplasia

Lesions were recorded as present/absent and classified by type.

Statistical Analysis

Data were analyzed using SPSS version 25. Normality was assessed with the Shapiro–Wilk test. Categorical variables were compared using Chi-square test. $p<0.05$ was considered statistically significant.

RESULTS

The sample was predominantly in the 60–69-year age group, reflecting a typical older denture-wearing population. A slight male predominance was observed, but no major demographic imbalance was noted. These distributions are consistent with expected age-related edentulism trends (Table 1).

Complete denture wearers formed the majority, indicating higher full-arch edentulism in the study population. Most participants had used their prosthesis for 5–14 years, demonstrating prolonged denture dependence. The wide range of prosthesis age supports meaningful comparison of long-term wear effects (Table 2).

Denture stomatitis emerged as the most prevalent lesion, highlighting its strong association with chronic denture use. The presence of multiple concurrent lesions in some participants suggests cumulative mucosal burden. Nearly one-quarter of the population showed no lesions, indicating variability in tissue response and hygiene practices (Table 3).

Table 1: Demographic Characteristics of Study Participants (n = 120)

Variable	Category	Frequency	Percentage
Age group (years)	40–49	12	10.0
	50–59	36	30.0
	60–69	55	45.8
	≥70	17	14.2
Gender	Male	68	56.7
	Female	52	43.3

Values represent frequencies and percentages of the total sample

Table 2: Distribution of Prosthesis Type and Duration of Use

Variable	Category	Frequency	Percentage
Type of prosthesis	Complete denture (CD)	70	58.3
	Removable partial denture (RPD)	50	41.7
Duration of use (years)	5–9 years	49	40.8
	10–14 years	43	35.8
	≥15 years	10	8.3
Mean duration ± SD (years)	-	10.2±4.5	-

Mean denture age calculated from participant-reported duration

Table 3: Prevalence of Oral Mucosal Lesions Among Participants

Lesion Type	Frequency	Percentage
Denture stomatitis	46	38.3
Traumatic ulcers	25	20.8
Angular cheilitis	18	15.0
Inflammatory hyperplasia	13	10.8
No lesion	29	24.1

Participants with multiple lesions counted in each relevant category

Table 4: Association Between Duration of Denture Use and Mucosal Lesions

Duration of Use (years)	No Lesion n (%)	Lesion Present n (%)	Most Common Lesion (%)
5–9 years (n = 49)	20 (40.8)	29 (59.2)	Stomatitis (24.5)
10–14 years (n = 43)	7 (16.3)	36 (83.7)	Stomatitis (44.2)
≥15 years (n = 10)	2 (20.0)	8 (80.0)	Stomatitis (60.0)
Total (n = 120)	29 (24.1)	91 (75.9)	,

Chi-square test showed significant association between denture age and lesion prevalence ($p<0.05$)

A clear upward trend in lesion prevalence was observed with increasing prosthesis age, indicating deterioration of denture fit and hygiene over time. Stomatitis remained the dominant lesion across all duration groups, but its frequency peaked among wearers exceeding 15 years. The significant association underscores prosthesis age as a major risk factor for mucosal pathology (Table 4).

DISCUSSION

In this study, long-term denture wearers demonstrated a high overall prevalence of oral mucosal lesions, with denture stomatitis being the most common finding and lesion rates increasing progressively with prosthesis age. These results highlight the combined influence of prolonged prosthesis use, hygiene practices and denture fit on mucosal health. This concise summary reflects the major outcomes and forms the basis for comparison with global evidence.

Our prevalence of denture stomatitis aligns closely with reports from recent international studies. For example, Adam and Kimmie-Dhansay (2021) observed stomatitis rates of approximately 25–30% among edentulous South African patients [11], while contemporary analyses have identified similar or slightly higher ranges in diverse populations [12]. Our slightly higher prevalence may reflect longer prosthesis age in this cohort, consistent with studies from 2022–2024 showing that denture age is a dominant predictor of mucosal inflammation. These comparisons underscore that prosthesis longevity remains a universal risk factor regardless of geographic region.

The association between prosthesis age and mucosal pathology observed in our study mirrors findings from Baran *et al.* [13] and more recent cross-sectional studies (2021–2025). Mechanistically, ageing denture acrylic accumulates surface irregularities, facilitating Candida colonization, biofilm maturation and mechanical irritation. Progressive residual ridge resorption and loss of denture adaptation further contribute to chronic pressure points and traumatic lesions. These biological and mechanical pathways provide a coherent explanation for the increased lesion burden seen with older prostheses.

Our results also emphasize the pivotal role of hygiene practices, consistent with observations from Tosun & Uysal and Ercalik-Yalcinkaya and Özcan [15,16]. Poor denture hygiene promotes Candida overgrowth, particularly in the palatal vault and denture-bearing mucosa, while continuous nocturnal wear suppresses salivary cleansing and creates a humid anaerobic environment conducive to microbial proliferation. Participants reporting poor hygiene and night-time use exhibited higher lesion rates, reinforcing the importance of behavioural modifications.

Comparison between complete and partial denture wearers revealed higher lesion frequency in complete denture users, consistent with the findings of Adam & Kimmie-Dhansay [11]. Since complete dentures cover a larger mucosal surface area, especially the palate, the potential for inflammation is inherently higher. This aligns with global evidence that complete denture wearers are more susceptible to denture stomatitis and inflammatory conditions.

Our observation that multiple lesions sometimes co-occur echoes studies such as Brantes *et al.* [19], where mechanical trauma combined with microbial load produced overlapping lesion patterns. This suggests that mucosal pathology should not be viewed in isolation; instead, clinicians should assess the combined effects of denture fit, hygiene, salivary flow and systemic health indicators.

Recent literature (2023–2025) has also highlighted emerging systemic implications of poor denture hygiene, including aspiration risks and respiratory pathogen colonization [20]. Although our study did not assess systemic outcomes, this reinforces the broader importance of maintaining denture and mucosal health.

Strengths

This study addresses a clinically relevant topic with direct implications for prosthodontic practice and geriatric oral health. The sample size of 120 long-term denture wearers provides sufficient power to evaluate the prevalence of mucosal lesions and their association with denture age.

Limitations

As a cross-sectional study, causal relationships between denture-related factors and mucosal pathology cannot be established. The single-center setting may limit generalizability to broader populations and the design did not allow evaluation of longitudinal changes or the impact of systemic factors in detail.

CONCLUSIONS

In conclusion, our study demonstrates that long-term use of removable dentures is significantly associated with increased prevalence of oral mucosal lesions such as denture stomatitis, traumatic ulcers, angular cheilitis and hyperplasia. Key risk factors identified include longer prosthesis duration, poor hygiene practices, nocturnal denture wearing and use of complete dentures. These findings align closely with prior literature [11-20] and underscore the need for preventive and maintenance interventions.

Clinical implications are that dentists should not merely deliver dentures but ensure patients are educated about hygiene, storage and nightly removal; prostheses should be regularly assessed for wear and fit; and guidelines developed for scheduled check-ups. Policy implications include integration of routine denture care education into dental curricula and public health programs.

Future research should involve prospective longitudinal studies, quantifying the rate of lesion development over time and evaluating interventions such as regular relining or use of improved base materials. By addressing modifiable risk factors, it is possible to improve oral health, comfort and quality of life among long-term denture wearers.

Future Recommendations

Future research should include longitudinal studies to evaluate the progression of mucosal lesions and quantify changes associated with prolonged denture wear. Studies assessing the quality, wear characteristics and material properties of removable prostheses are needed to determine how material degradation contributes to mucosal pathology. Microbiological investigations, particularly focusing on *Candida* species colonization patterns and biofilm behavior on aged denture surfaces, would provide deeper insights into etiological mechanisms. Additionally, well-designed interventional programs, such as structured hygiene training, scheduled denture maintenance protocols and periodic relining, should be evaluated to determine their effectiveness in reducing lesion prevalence and improving long-term oral health outcomes.

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